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# The Grog Ration

Antiquitus Medicinus

## Navy Medicine in California: The First Ships and Structures

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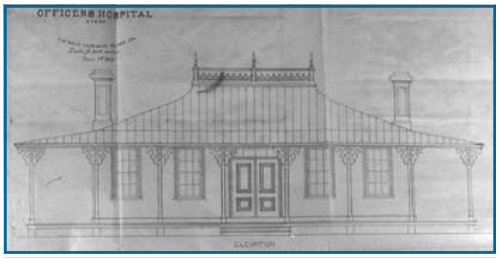
Main entrance of the Naval Hospital, Mare Island, CA, after 1875. Large water tanks were located under the mansard roof in the Towers. (National Archives, San Bruno, CA)

**NOTE: This is the second, and final, installment of the article that appeared in the July-August issue of *The Grog Ration.***

Even as work on the granary conversion was progressing, Congress, in March 1863, passed a $25,000 appropriation "For a Hospital, Mare Island, Cal.". Upon receiving notice of these funds, Navy Yard Commandant Selfridge promptly appointed a panel of officers to select an appropriate hospital site, and the Bureau of Yards and Docks approved the selection in July. But there things lay for a time. Some of the appropriated funds were apparently used for site preparation, and some, incorrectly as it turned out, for operating the temporary hospital. The money left over from this small sum would hardly be enough to build a hospital.




**A delightful design for the proposed "Officers Hospital" at the Mare Island Navy Yard. This did not receive approval from the Bureau of Medicine and Surgery . (National Archives)**

A year later, in April 1964, BUMED Chief Whelan wrote Selfridge to indicate that the situation in Congress was still somewhat fluid: "[the] Naval Committee of the House was apparently disinclined to act upon the subject; but the Finance Committee of the Senate has proposed an amendment to the Naval Appropriation Bill allotting $75,000 for the Hospital; but the bill has not yet passed Congress." He continued "As soon as funds shall become available instructions will be given…; but in the meanwhile it is considered prudent to wait, till all uncertainty be removed."

Congress did finally approve hospital appropriation. In late May, Whelan indicated to Selfridge that he thought about $90,000 would be available for hospital construction, and that "it is pretty manifest that Congress expects the funds on hand to be sufficient for such Hospital accommodation as the Navy may need in California for many years to come."

Soon, however, another problem appeared. The Union government, as early as 1862 faced the prospect of running out of gold with which to pay for the Civil War effort. It solved the gold shortage by taking the currency off the gold standard. Almost immediately workers in California demanded a 25 – 40% "premium" if they were to be paid in greenbacks—"legal tender"—instead of gold coin. Faced with the "present depressed state of the currency" (we would call it "inflation" today), Selfridge in California, and officials in Washington, DC agreed that a further delay of the hospital project would be the better part of valor. Facing up to the reality of the currency situation, Whelan, writing in 1864, requested an additional $75,000 appropriation in his BUMED submission for the 1866 Naval Estimates.

Despite the currency problem, a "local solution" appeared on the scene. Late in 1865, S. C. Bugbee, a well-known San Francisco architect, came to Mare Island to present his plans to design and build a 100-bed hospital for $95,000—in legal tender (greenbacks)! There was a brief flurry of telegraphic correspondence between him and Whelan, but nothing came of the issue.

Things dragged on. 1866 was a year of discontent for West Coast medical people. The tight bed situation required overflow patients to be hospitalized in USS *Independence* or in the recently constructed Marine barracks nearby; offi-

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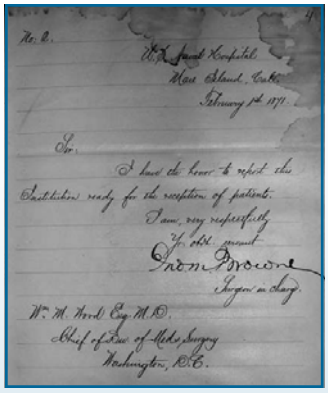

Letter written by Dr. J. Mills Browne to Bureau of Medicine and Surgery Chief William Maxwell Wood, dated 1 February 1871. In this letter, Dr. Browne announces, "I have the honor to report this installation ready for the reception of patients." (National Archives)

*"McArthur's plans called for brick construction—in earthquake country."*

## Navy Medicine in California: The First Ships and Structures (Cont'd)

cers were sent to the San Francisco Marine Hospital. That their sickest patients were located hither and yon added to the strain faced by the busy surgeons.

In an effort to keep the officer patients—who didn't cotton to being hospitalized with merchant mariners in the San Francisco hospital—on Mare Island, Surgeon John Browne, again recently returned to the Island from another assignment, presented drawings for a delightful structure "of size sufficient to furnish apartments for six officers & at as little cost as possible." In January 1866, Commandant McDougal added his endorsement of the building stating that "the building proposed will be of wood, and estimated the estimated cost by the Civil Engineer will be about twenty eight hundred… dollars in gold.—On completion of the [permanent] Hospital, this building could be removed to the hospital ground and used as a Porter's lodge." This proposal received the "request denied" stamp.

Nevertheless, movement was evident in Washington. All though 1866 Philadelphia architect John McArthur, Jr. was engaged in constructing the new Naval Hospitals in that city and at Annapolis. This ready-made relationship with the Bureau made it a natural step for BUMED Director Phineas Horwitz MD to ask the harried architect for "sketches for the California Hospital." These McArthur promptly supplied. Two weeks later, Horwitz put on the brakes once again, citing "the unexpected rise in the premium on gold…"—more inflation and rising construction costs.

But the die was cast. In June 1867, Congress increased the Hospital appropriation to $120,000, and in July, Horwitz again contacted McArthur. The project ground slowly along, largely because the architect was very busy with the other Navy projects. Finally, after several telegrams from an exasperated Horwitz, the architect reported his plans "ready for the Photographer," in January 1869. They went into the mail to California on the 13th.

Early in April 1869, the Commandant of the Yard advertised for bids in the San Francisco newspaper *Alta California.* The returning bids ranged from $204,000 to $148,000—recall that Congress appropriated $120,000--and after a flurry of telegraphic communications between Yard and Bureau, the lowest bid, that of Dennis Jordan of San Francisco, was duly accepted and the contract signed.

Time was now of the essence if construction was to commence before the clay California soil dried into a hard mass, complicating the process of excavation in a time before power equipment. Commandant Craven appointed Surgeon Browne, and the Yard's chief Civil Engineer Calvin Brown, as Superintendents of Construction. On August 2nd, Browne and Brown were able to report the necessary excavations completed. The contractor used nearly 3,500 cubic yards of the excavated earth to construct a road to a "small wharf, lately built,…sufficient for the reception and conveyance of all construction material" to the island location.

McArthur's plans called for brick construction—in earthquake country. The superintendents were aware of bricks' vulnerability, and keying on local construction technique, recommended "the introduction of a proper iron band in the brick work, as is generally being adopted in this vicinity." The Bureau approved "up to ten" bands of "1 1/2 inch iron" to be thus imbedded.

One of the keys to contractor Jordan's successful low bid was his money-saving scheme to make the bricks needed for the project from clay dug out of the construction site. He built two kilns adjacent to the excavation to "burn the clay"; the resulting million and a half bricks were reportedly "hard, of good color and of superior quality." The local product was said to have contributed greatly to the handsome appearance of the building once completed, and commentators of the time opined that brick-making might even become an emerging industry for the area.

Early December saw the second story walls already built, and some of the roof in place. This was just in time, because the rainy season, somewhat delayed that year, soon started. By April 1870, most of the interior work of the building was done, and "bells and speaking tubes" had been installed. In May, Browne wrote about the "propriety of preparing [an] appartment [sic] in the hos-

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## Navy Medicine in California: The First Ships and Structures (Cont'd)

pital for the reception of an insane or refractory patient." This measure was duly approved. The cell with iron barred door and window took up an unoccupied corner in the cellar.

Finally, on May 28th, the superintendents wrote "We have the honor to announce the completion of the Naval Hospital at this station," and enclosed copies of the official report of acceptance by a Board designated for this purpose. The report was laudatory, noting "that the Contractors have fulfilled their contract in good faith and the work throughout is exceedingly well done in all respects. All arrangements are complete and we think are admirably adapted for Hospital purposes with the latest improvements."

Myriad details remained before the Hospital would be ready to receive patients: furniture to be procured both locally and from the East, and staff hired. A surgical operating table arrived from the East, acknowledged "with pleasure." Medicines and medical equipment had to be requisitioned from the Navy Laboratory in Brooklyn, and from local suppliers in San Francisco. The first volumes for the medical library arrived. On Christmas Eve, Browne requisitioned a horse, wagon, and harness "owing to the distance of the Hospital from the Navy Yard proper…" The purchase of 300 tons of "Pennsylvania (Scranton) coal" at $13.50 per ton was one of the last acts preparatory to the hospital's opening.

At long last, the work was done and Surgeon Browne, now designated Surgeon in Charge, proudly announced, "I have the honor to report this Institution ready for the reception of patients" on 1 February 1871—more than 16 years after Farragut set foot on Mare Island with his map bearing a hospital site.

This hospital served the West Coast Navy and Marine Corps, undergoing quite remarkable technological transformation by the introduction of telephones, gas and then electric lighting, water pumped from 25 miles away to replace the unreliable supply of roof runoff collected in cisterns near the foundation, the establishment of a purpose-built operating room, and the introduction of an x-ray machine—all before the structure received serious damage in the magnitude 6.5 (estimated) Mare Island Earthquake of 31 March 1898.

John McArthur, Jr. achieved renown for designing Philadelphia's City Hall.

In 1901, at the time of its completion, it was the tallest building in the United States.

## Notes on John Haviland and William Strickland

The Navy Medical Department has a rich tradition of architecture going back to its original medical facilities. The list of architects and designers of Navy hospitals, which include Ernest Flagg (Annapolis and Washington, DC), John McArthur, Jr. (Mare Island), and, arguably, President Franklin D. Roosevelt (Bethesda) must begin, however, with John Haviland (1792-1852) and William Strickland (1788-1854).

In the 1820s, after many years of relying on makeshift medical facilities and Marine (later Public Health Service) hospitals, the U.S. Navy purchased land in Brooklyn, NY, Chelsea, MA, Philadelphia, PA, Portsmouth, VA, and Washington, DC, as future sites of permanent hospitals. Haviland and Strickland, who achieved renown as founders of the American Neo-Classical (or Greek Revival) style, submitted plans to the Secretary of the Navy for hospitals in Philadelphia and Portsmouth which were accepted. Expenditures for their hospitals would exceed the amount available in the Navy's Hospital Fund and delayed the completion of these hospitals. However, the need for these medical facilities was so great that the Navy began to admit patients at Naval Hospital Portsmouth in July 1830, years before it was finally completed.

Among Haviland's other creations was Eastern State Penitentiary, a landmark that still stands today. This prison, with it's panoptical design, served as a standard design for prisons throughout the globe. Philosophically, Haviland's panopticon prison—with its "all seeing" guards—grew out of Jeremy Bentham's theory for the model prison. And its design was undoubtedly an influence on Michel Foucault when he wrote his seminal work *Discipline & Punish* (1975).

William Strickland would go on to design the Merchant Exchange and the Second Bank of the United States (both located in Philadelphia). Each are, surely, two of the most elegant buildings in the United States today.

**Did you know?**

From 1833 to 1976, William Strickland's U.S. Naval Asylum was in continuous operation, first as a hospital and later as a home for elderly and disabled Navy and Marine Corps veterans. Though rundown and neglected, the building still stands. today.

# Japan's Lind: Baron Kanehiro Takaki and the Cause of Beriberi

By Alan Hawk,
Historical Collections National Museum of Health and Medicine, AFIP

Soldiers of the Imperial Japanese Army suffered much from beriberi (or Kak'ke in Japanese) during the first half of the twentieth century. Beriberi is the result of a prolonged thiamin deficiency whose symptoms include fatigue, poor reflexes, irritability, memory loss, and sleep disturbances. More severe cases include neuropathy of the legs and/or edema accompanied by high out-put congestive heart failure. The research leading to this understanding of the disease was one of the landmarks of 19th century Japanese medical research.

**Baron Kanehiro Takaki in the 1870s. (Otis Historical Archives, NMHM-AFIP McGee 66)**

Japan's reliance on rice as a staple made beriberi inevitable. Rice was considered the heart of Japanese civilization. Polished white rice was more desirable, even considered a status symbol, than rice still in husks; it also had the advantage of having a longer shelf life. The Japanese were proud of their diet. In 1906, Col. Valery Havard, an American medical officer who observed the Russo-Japanese War, reported that the Japanese attributed "…their physical and mental strength to their plain, frugal diet, the free use of water (internally and externally), gymnastics and temperate habits. A laborer will work a whole day on a dinner of tomatoes, cucumber and salad, but I hope it is seldom that he is obliged to do without his favorite bean soup or boiled rice. Tea is taken without milk and sugar." However, he added, "The result of this regime is a race of small stature (compared with Chinese and Koreans), prone to beriberi, but hardy and sturdy, and with wonderful mental power of expansion and assimilation."

The discovery that beriberi was caused by a nutritional deficiency was one of the triumphs of nineteenth-century Japanese medicine. Baron Kanehiro Takaki, who was taught medicine by the English physician William Willis, entered the navy as a medical officer in 1872 and quickly realized that many sailors were afflicted with beriberi. It was a disease he had some knowledge about. He remembered when he was younger, his father, a Daimio sent to protect the Imperial Palace in Kyoto, told him about beriberi, which caused the death of many palace guards. According to Takaki, "They attributed the cause to food, and called the provision box the beriberi box." By the time he had left for England to continue his medical education, he had seen several hundred cases at the Naval Hospital, many of which ended in death. Upon his return in 1880, little had changed. As he studied the cases, he was unable to discern a pattern. While beriberi was common in the late spring and summer months, it was not limited to warm weather. Its occurrence varied in naval bases as well as on different vessels. Although sailors might share the same quarters on a given ship, some would develop beriberi and others would not. Takaki observed that European sailors seldom had beriberi, despite being in the same waters, exposed to the same climate, living in similar ships and engaging in similar tasks. In 1883, he inspected living conditions on board naval vessels and in barracks and observed that although working hours, clothing, and cleanliness of quarters were similar throughout the navy, there was considerable variation in the diet.

Based on scientific estimates that a person's diet should include 350 grams of carbon and 20 grams of nitrogen, Takaki concluded that the navy's diet was insufficient in nitrogenous substances. Takaki developed a diet with a better ration of nitrogen and carbon that was tested on the vessel *Taukuba* in 1884 as it sailed to New Zealand, South America, and Hawaii. This voyage recreated an 1883 cruise of the training ship *Ryujo* that resulted in 169 cases of beriberi, 25 of which were fatal, among the 276-man crew. In contrast, the *Taukuba* arrived in Honolulu, with only fourteen cases. Upon investigation, Takaki discovered that all fourteen had refused to eat the nitrogen-rich portions of the diet such as condensed milk and meat. Based on these findings, his diet plan was adopted for the fleet and the ratio of beriberi per 1,000 of the force dropped from 1.244 in 1884 to 0.004 in 1886. The diet was based on a faulty premise since, by the 1930's, scientists had discovered the beriberi was the result of a thiamin deficiency. In his search for a balanced nitrogen-carbon diet, Takaki stumbled on a combination of foods that provided thiamin that polished white rice lacks.

Beriberi also afflicted Imperial Japanese Army garrisons. In 1884, more than half of the soldiers stationed at an army base in Tokyo had beriberi. On Okinawa, 43.12% of the troops were afflicted despite its rarity among the native population. In the same year, over a quarter of the 36,483 soldiers in the army suffered from beriberi. Tadanao Ishiguro, Surgeon General of the Army, was intrigued by the apparent success of the navy in preventing beriberi. He wrote to Rintaro Mori, a Japanese student studying under Carl Von Voit, an eminent German nutritionist, asking whether the army should continue relying on rice as its staple. Mori responded that there were no shortcomings with rice and suggested that there was no reason for the army to remove it from the ration.

However, an effort to economize the food expenditures at Japanese prisons suggested a solution to the problem. The introduction in 1875 of barley mixed with the rice given to inmates had the unexpected benefit of almost eradicating the disease. After the government's passage of a law requiring the prison ration to be six parts barley and four parts rice, beriberi became rare in Japanese prisons. Based on this success, the command at the Osaka Garrison instituted the same ration for its soldiers in 1885. The ratio of soldiers suffering from beriberi dropped to 10 per 1,000. As barley was introduced into rations at other garrisons, the toll that beriberi took on the soldiers declined dramatically.

Despite the fact that both the army and the navy had simultaneously and independently solved their beriberi problem by changing diet, physicians were reluctant to accept the notion that beriberi was a nutritional deficiency. Many argued it was an infectious disease, developing in damp soil, with diet as a predisposing

**Story continued on page 5**

cause. On April 14, 1885, Masanori Ogata, lecturer in the Department of Hygiene of the University of Tokyo, publicly announced the discovery of a "beriberi bacillus." Takaki was the only person in the audience to take issue with the conclusion, pointing to his success and arguing the cause was dietary imbalance. After Ogata's findings were published, Robert Koch, with one of his students, Shibasaburo Kitasato, attempted to replicate the findings and concluded that the organism did not cause beriberi. At the request of his professor, Kitasato wrote a rebuttal to Ogata's conclusions published in both German and Japanese. By the turn of the century, both western and Japanese doctors continued to debate whether the cause was a fungus or toxin associated with the rice, an infectious organism or diet. While critics of Takaki argued that his success was really due to improved sanitation on ships, navy physicians were convinced that a well-balanced diet would prevent the disease. Shigemichi Suzuki, Director General of Medicine of the Navy concluded in 1901 that, "the circumstances …show that Kak'ke can not be regarded as an infectious disease."

**Russo-Japanese War**

On February 9, 1904, the Japanese attack on the Russian city of Port Arthur began the Russo-Japanese War. While Japanese soldiers confronted ferocious firepower on the battlefield, there were few endemic diseases in the area of operations. The army emphasized providing their soldiers with a clean water supply. Since these soldiers preferred hot tea, the water they drank had been sterilized preventing the spread of cholera, typhoid fever, and diarrheal diseases. Mosquito-borne illnesses, such as malaria, were virtually non-existent.

However, one disease took a disproportionate toll on the army as the American physician, Dr. Anita Newcomb McGee, noted, "…there is more dysentery than typhoid, but (the army's) great disease-enemy is beriberi…" It caused almost half the sickness in the army during the campaign and, as McGee noted, almost 70% of one unit returning from the front was afflicted with beriberi. During the siege of Port Arthur, 20,000-25,000 men were sent home from the 80,000-man Third Army because of the disease. As Takaki noted, "…Owing to circumstances, only rice was given to the men as the principal food, and consequently cases of beriberi increased greatly." The soldier's ration during the siege was 5 ounces of meat and 30 ounces of rice, which they were expected to cook themselves. In contrast, sailors of the Naval Brigade participating in the siege were given 1 pound of meat, 10 ounces of barley and 20 ounces of rice per day and sustained few cases of beriberi.

**Vitamin B1**

As a naval officer, Takaki had the authority to implement his diet within the navy. However, his results were treated with skepticism throughout the Japanese medical community. While army surgeons recognized the navy's success, they argued that changing the ration would not yield the same benefits because sailors enjoyed better living conditions than troops in the field. A battleship was easier to disinfect than the battlefield. Army surgeons noted that disease was more common on the coast and seemed to be influenced by relative humidity and fluctuation in temperature. In addition, they noted that soldiers who endured poor sanitation, overexerted themselves, dug holes, and slept on the ground were likely to get beriberi.

Part of the problem was the different service cultures and orientation of their medical departments. Most Japanese medical schools were modeled on the German system (i.e., more inclined to look for infectious diseases). The Japanese Naval Medical College in Tokyo was the one exception. In 1873—in the era of Robert Koch—the Medical College appointed British surgeon William Anderson as its first director. The British—steeped in a tradition that included James Lind work on scurvy—were much more likely to take in account the dietary causes of disease. Takaki, who attended Anderson's alma mater, St. Thomas's Medical School in London, was something of a rarity among Japanese physicians.

Inter-service rivalry also exacerbated the problem, as illustrated by the conclusion written by Shigemichi Suzuki, Surgeon General of the Navy; who wrote "If the Army authorities had tried to prevent the occurrence of Kak'ke among the soldiers *as the Japanese naval authorities did many years ago (in the Navy there was practically no Kak'ke during the whole war)* [author's italics], the sanitary record of the Army would have been better than that shown above."

Finally in February 1905, General Terauchi, the Minister of War, forced the Army to change the ration, substituting barley for a portion of the rice, ostensibly as an economic measure. Soldiers did not care for the mixture, which they called 'black rice' because of the dark specks. The fact that it was also the prison ration did not help its popularity. However, it dramatically reduced the incidence of beriberi among Japan's fighting force.

Early twentieth century research on "accessory food factors" began to make Takaki's conclusions seem more plausible. In 1897, Christian Eijkman in the Netherlands East Indies (now Indonesia) discovered that chickens fed a diet of polished rice quickly developed beriberi-like symptoms, which quickly disappeared when the rice hulls were added to the diet. Elmer McCollum isolated a growth-promoting factor, which he called "fat-soluble A" in 1915. He called Eijkman's discovery "water-soluble B," which later became known as Vitamin-B1. In 1934, Robert Williams, an American chemist, isolated thiamin, the molecule for Vitamin B1.

**NOTE: This article is an extract from *"The Great Disease Enemy, Kak'ke (Beriberi) and the Imperial Japanese Army,"* Military Medicine, 171:4 (April 2006):333-339.**

# Scuttlebutt: Maritime History Happenings

**The First U.S. Naval Hospital.** In October 1804, Surgeon Edward Cutbush established what is considered to be the first U.S. Naval Hospital outside the United States. Located in Syracuse, Sicily, in the villa of Count Don Saverio Landolina, this facility served as the primary hospital for the Mediterranean Fleet. Recently two Navy medical officers stationed in Italy tracked down and took pictures of the old hospital/villa. The story of Dr. Cutbush and the founding of Naval Hospital Syracuse will appear in a future edition of ***The Grog Ration***.

Courtyard of Count Don Landolina's villa. The villa served as a U.S. Naval Hospital from 1804-1806. Photo was taken by CAPT Dale Molé, MC, USN.

**SHNM Announces 1st Annual Meeting and Paper Session.** The recently founded Society for the History of Navy Medicine announces its first Annual Meeting and Paper Session, to be held during the annual meeting of the American Association for the History of Medicine in Montreal, 3 - 6 May 2007. The Society solicits papers concerning any aspect of the history of medicine in the maritime environment (including above and below the surface of water). Graduate student work and other "works-in-progress" are particularly encouraged. Electronic submission of a 200-250 word abstract is particularly welcomed, though faxed or mailed submissions will be accepted. If interested, please send your paper proposals to:

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**Source material**. Due to limited space in this newsletter, article source material has been omitted. However, it must be noted that Dr. Harold Langley's *Social Reform in the United States Navy, 1798-1862* (1967) has served as an invaluable source for a number of articles published in *The Grog Ration*. Langley's book offers a fascinating account of the reform spirit of the early U.S. Navy that impacted everything from the regulation of medical supplies (and Grog) on ship and shore to the last days of Navy Board of Commissioners "rule."